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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,264	06/27/2001	Nir N. Shavit	112047-0036	1888
45774	7590	07/27/2005	EXAMINER	
KUDIRKA & JOBSE, LLP ONE STATE STREET, SUITE 800 BOSTON, MA 02109			TANG, KENNETH	
			ART UNIT	PAPER NUMBER
			2195	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/893,264

Applicant(s)

SHAVIT ET AL.

Examiner

Kenneth Tang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This application is in response to the Amendment filed on 7/8/05. Applicant's arguments have been fully considered but were not found to be persuasive.
2. Claims 1-57 are presented for examination.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 15-28 are directed to method steps which can be practiced mentally in conjunction with pen and paper, therefore they are directed to non-statutory subject matter. Specifically, as claimed, it is uncertain what performs each of the claimed method steps because it is not tangible. The examiner suggests applicant to change "method" to "computer implemented methods" in the preamble to overcome the outstanding 35 U.S.C. 101 rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-57 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

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- a. In claim 1, "that thread" (lines 13 and 23) is indefinite because it is not made explicitly clear in the claim language which thread from "each thread" (line 8) this refers to.
- b. Claims 15, 29, 43, and 57 are rejected for the same indefinite reasons as in claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5, 7-9, 11-19, 21-23, 25-33, 35-37, 39-47, 49-51, and 53-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blelloch et al. (hereinafter Blelloch) (US 6,434,590 B1) in view of Kawachiya et al. (hereinafter Kawachiya) (US 2001/0025295 A1).

2. As to claim 1, Blelloch teaches a computer system that employs a plurality of threads of execution to perform a parallel-execution operation in which the threads identify tasks dynamically and in which the computer system comprises:

A) a separate status-word field (status buffers SB1) with each of the threads (*col. 5, lines 22-35*); and

B) a mechanism that operates the threads in a manner that (*col. 5, lines 19-47*):

i) each thread executes a task-finding routine to find tasks previously identified dynamically and performs tasks thereby found, with its status-word field containing a value indicating it is active (live tasks), until the task-finding routine finds no more tasks (*col. 12, lines 3-15, col. 13, lines 47-65*);

ii) when the task-finding routine executed in step (i) finds no more tasks, that thread sets the contents of its status-word field a value indicating it is inactive (updates the status buffer SB1 and flag) (*col. 5, lines 19-48, col. 6, lines 44-67 through col. 7, lines 1-36*);

iii) after completing step (ii) and while the status-word field (flag) associated with any other thread contains a value indicating that the other thread is active, that thread continues to search for a task using the ask-finding routine, and, if it finds one, sets (updates) its status-word field contents to a value indicating that it is active before attempting to execute a found task (*col. 5, lines 19-48, col. 6, lines 44-67 through col. 7, lines 1-36*); and

iv) during step (iii) when none of the status-word fields contains an activity-indicating value that an associated thread is active and no task has been found, that thread terminates (operation ends) its performance of the parallel-execution operation (*col. 5, lines 40-52*).

3. Blleloch teaches using a buffer manager BM1 to manage the various status buffers SB1 (contains the status-word field) (*col. 5, lines 22-35*) but fails to explicitly teach using a mechanism (global status word) that associates with the separate status-word field of the threads. However, Kawachiya teaches a parallel processing garbage collection system that uses global

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reference objects of states/status associated and substituted with other objects of states/status (*page 2, [0020]*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of using a global status word that associates with the separate status-word field of the threads because this would increase the control of the system by allowing the thread to detect the occurrence of a condition whereby the state of object should be changed (*page 2, [0020]*).

4. As to claim 2, Kawachiya teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

5. As to claim 3, Blelloch teaches a computer system as defined in claim 1 wherein:

A) each thread has associated with it a respective work queue in which it places task identifiers of tasks that thread identifies dynamically; B) the task-finding routine executed by that thread includes performing an initial search for a task identifiers in the work queue associated with that thread and, if that work queue contains no task identifiers that thread can claim, thereafter performing a further search for a task identifier in at least one other task-storage location (*col. 5, lines 19-52, col. 12, lines 3-15, col. 13, lines 47-65*).

6. As to claim 4, Kawachiya teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

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7. As to claim 5, Blelloch teaches a computer system wherein the at least one other task-storage location includes at least one work queue associated with a thread other than the executing thread (*col. 5, lines 19-52*)

8. As to claim 7, Blelloch in view of Kawachiya fails to explicitly teach wherein the task-finding routine includes selecting in a random manner the at least one work queue associated with a thread other than the executing thread. However, "Official Notice" is taken that both the concept and advantages of providing that selecting in a random manner at least one work queue associated with a thread other than the executing thread is well known and expected in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include selecting in a random manner at least one work queue associated with a thread other than the executing thread to the existing system in order to ensure an unbiased selection.

9. As to claim 8, Blelloch teaches wherein the further search includes repeatedly searching a work queue associated with a thread other than the executing thread until the executing thread thereby finds a task or has performed a number of repetitions equal to a repetition limit greater than one (*col. 5, lines 19-52*).

10. As to claim 9, it is rejected for the same reasons as stated in the rejection of claim 7.

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11. As to claim 11, Blleloch teaches wherein the contents of all of the status word fits in a memory location accessible in a single machine instruction (every action requires a single time step to be executed) (*col. 11, lines 12-15*).

12. As to claim 12, Blleloch teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

13. As to claim 13, Blleloch teaches wherein each status-word field is a single-bit field (flag) (*col. 6, lines 44-67*).

14. As to claim 14, Blleloch teaches wherein the activity-indicating value is a logic one and the inactivity-indicating value is a logic zero (flag) (*col. 6, lines 44-67*).

15. As to claims 15-19 and 21-23, they are rejected for the same reasons as stated in the rejection of claims 1-9.

16. As to claims 25-28, they are rejected for the same reasons as stated in the rejection of claims 11-14.

17. As to claims 29-33, they are rejected for the same reasons as stated in the rejection of claims 1-5.

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18. As to claims 35-37, they are rejected for the same reasons as stated in the rejection of claims 7-9.

19. As to claims 39-42, they are rejected for the same reasons as stated in the rejection of claims 11-14.

20. As to claims 43-47 and 49-51, they are rejected for the same reasons as stated in the rejection of claims 1-9.

21. As to claims 53-56, they are rejected for the same reasons as stated in the rejection of claims 11-14.

22. As to claim 57, it is rejected for the same reasons as stated in the rejection of claim 1.

Allowable Subject Matter

23. Claims 6, 10, 20, 24, 34, 38, 48, and 52 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

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24. During patent examination, the pending claims must be “given their broadest reasonable interpretation consistent with the specification.” *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

25. *Applicant argues on pages 15-16 of the Remarks that Blleloch does not disclose that the threads themselves find and execute tasks.*

In response, the Examiner respectfully disagrees. Applicant acknowledges that Blleloch teaches a thread processing system wherein threads are grouped in to tasks. The broadest reasonable interpretation of a thread is a computer instruction. And in the cited portion of Blleloch (*col. 5, lines 23-53*), it is disclosed that program instructions (threads) are used to determine which tasks to execute.

26. *Applicant argues on page 16 of the Remarks that the task queue and buffers manager is not the thread that executed a task finding and performed found. In addition, there is no indication that the task queue and buffers manager is the same as the aforementioned scheduler.*

In response, the thread is the computer program instruction that are used to determine which tasks to execute (*col. 5, lines 23-53*). In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., scheduler) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read

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into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Even so, Blleloch teaches scheduling using a scheduler (*col. 5, lines 23-53*).

27. *Applicant argues on page 17 of the Remarks that Blleloch does not teach that each thread examines the status-word fields and terminates based on its own examination.*

In response, the Examiner respectfully disagrees. The broadest reasonable interpretation of a status-word field in light of the specification (page 4, lines 7-11) is merely a field that indicates activity. Blleloch teaches the use of flags to indicate activity/inactivity (*col. 6, lines 44-67 through col. 7, lines 1-36*). The flag serves as an end-of-program marker and based on how the flag is set, termination occurs (operation ends) (*col. 5, lines 23-52, col. 6, lines 44-67 through col. 7, lines 1-36*).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kt
7/22/05


MAJID BANANKHAH
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